(d) controlling the performance of the steps (a), (b), and (c) to enhance, in the output produced, the selectivity of said nerve, while the nerve is living in the *in vivo* region of the subject; and

(e) processing the output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the *in vivo* region to provide a conspicuity of the nerve that is at least 1.1 times that of the non-neural tissue, without the use of neural contrast agents.

Cancel Claim 104 and insert therefor the following new Claim 162:

--162. A method of utilizing magnetic resonance to determine the shape and position of mammal tissue, said method including the steps of:

(a) exposing an *in vivo* region of a subject to a magnetic polarizing field, the *in vivo* region including non-neural tissue and a nerve, the nerve being a member of the group consisting of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves;

(b) exposing the *in vivo* region to an electromagnetic excitation field;

(c) sensing a resonant response of the *in vivo* region to the polarizing and excitation fields and producing an output indicative of the resonant response;

(d) controlling the performance of the steps (a), (b), and (c) to enhance, in the output produced, the selectivity of said nerve, while the nerve is living in the *in vivo* region of the subject; and

(e) processing the output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the *in vivo* region to provide a conspicuity of the nerve that is at least 1.1 times that of the non-neural tissue, without the use of neural contrast agents, said processing including the step of analyzing said output for information representative of fascicles found in peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves.--

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Amend Claim 102 at line 1 by deleting "Claim 101" and inserting therefor Claim 162 .

Amend Claims 103 and 104 as follows:

~~103~~. (Amended) The method of Claim ~~89~~, wherein [said] step (d) [is used to exploit] includes the step of selecting a combination of echo time and repetition time that exploits a characteristic spin-spin relaxation coefficient of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves, said spin-spin relaxation coefficient of these nerves being substantially longer than that of other surrounding tissue.

~~104~~. (Amended) The method of Claim ~~103~~, wherein the [steps of exposing the *in vivo* region to an excitation field and producing an output are separated by] step of selecting said combination of echo time and repetition time includes selection of an echo time that is greater than 60 milliseconds to enhance the distinction of said nerve from non-neural tissue in the *in vivo* region.

Cancel Claim 105.

Amend Claims 106-109 as follows:

~~106~~. (Amended) The method of Claim ~~104~~[, wherein] further comprising the step of repeating said step of exposing the *in vivo* region to an excitation field [is repeated] after a repetition time that is greater than one second to enhance the distinction of said nerve from the non-neural tissue in the *in vivo* region.

~~107~~. (Amended) The method of Claim ~~104~~, wherein the non-neural tissue includes fat and [prior to said step (c),] said method further comprises exposing the *in vivo* region [is exposed] to electromagnetic fields that suppress the contribution of the fat in said output prior to producing an output at step (c).

~~108~~. (Amended) The method of Claim ~~89~~, wherein [the] step (d) [causes] includes the step of controlling said step (b) [of exposing] to expose the *in vivo* region to an excitation field [to induce] that induces a magnetization transfer from non-anisotropically diffusing water in the *in vivo* region to

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anisotropically diffusing water in said nerve, to more readily distinguish the nerve from non-neural tissue.

27 ~~109~~. (Amended) The method of Claim ~~108~~ 26, wherein the non-neural tissue includes fat and [prior to said step (c),] said method further comprises exposing the *in vivo* region [is exposed] to electromagnetic fields that suppress the contribution of the fat in said output prior to producing an output at step (c).

Amend Claims 111-113 as follows:

29 ~~111~~. (Twice Amended) The method of Claim ~~110~~ 28, wherein the [contribution] conspicuity of nerve is enhanced in said output and said steps (a), (b), and (c) are performed a second time to produce a second output in which the [contribution] conspicuity of blood vessels is enhanced and wherein said step (e) of processing the output includes the step of processing said output and said second output to suppress the blood vessels from said data set.

30 ~~112~~. (Amended) The method of Claim ~~89~~ 18, wherein, if the non-neural tissue in said *in vivo* region includes blood vessels and cerebrospinal fluid, said step (d) [suppresses] includes the step of selecting the polarizing field of step (a) and the excitation field of step (b) to suppress the blood vessels and the cerebrospinal fluid from said data set.

31 ~~113~~. (Amended) The method of Claim ~~89~~ 18, wherein said step [(d) suppresses] (c) includes the step of processing said output on an interleaved pixel-by-pixel basis to suppress the influence of motion of the *in vivo* region on said data set.

Cancel Claim 116 and insert therefor the following new Claim 163:

--~~163~~ 16. A method of utilizing magnetic resonance to determine the shape and position of mammal tissue, said method including the steps of:

(a) exposing an *in vivo* region of a subject to a magnetic polarizing field, the *in vivo* region including non-neural tissue and a nerve, the nerve being a member of the group consisting of peripheral nerves, cranial nerves numbers three through twelve, and autonomic nerves;

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(b) exposing the *in vivo* region to an electromagnetic excitation field;

(c) sensing a resonant response of the *in vivo* region to the polarizing and excitation fields and producing an output indicative of the resonant response;

(d) controlling the performance of the steps (a), (b), and (c) to enhance, in the output produced, the selectivity of said nerve, while the nerve is living in the *in vivo* region of the subject; and

(e) processing the output to generate a data set describing the shape and position of said nerve, said data set distinguishing said nerve from non-neural tissue, in the *in vivo* region to provide a conspicuity of the nerve that is at least 1.1 times that of the non-neural tissue, without the use of neural contrast agents;

wherein said steps (a) through (c) include the step of exposing the *in vivo* region to a readout gradient rephasing pulse and a slice-selective excitation pulse, said readout gradient rephasing pulse being generated directly before said output pulse is produced instead of directly after the generation of the slice-selective excitation pulse, so as to reduce the appearance of undesirable cross-terms in said data set.--

Amend Claim 117, at line 1, by deleting "Claim 116" and inserting therefor --Claim 163--.

REMARKS

The Office Action of February 6, 1995, includes the withdrawal of an earlier rejection of Claims 120-138 and Claims 150-161. Claims 89-92, 95, 97, 98, 103-115, 118, 119 and 139-149 remained under rejection. Claims 93, 94, 96, 99-102, 116 and 117 were deemed allowable, but were subject to objection for dependency upon one or more rejected claims.

In this response, applicants have canceled Claim 105 and have amended Claims 89, 102-104, 106-109, and 111-113, for additional clarity. Applicants also have canceled Claims 101 and 116, substituting therefor new Claims 162 and 163, respectively. New Claim 162 incorporates all limitations of Claim 89 and canceled Claim 101. New Claim 163 incorporates all limitations of

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